Please amend the claims of the present application as follows:

1. (Previously Presented) A process for optical filter construction, the process comprising the steps of:

growing layers having a high index of refraction via a self-limiting deposition process selected from the group consisting of atomic layer epitaxy, pulsed chemical beam epitaxy, molecular layer epitaxy, and laser molecular beam epitaxy;

growing layers having a low index of refraction;

depositing the high and low index layers onto a substrate;

monitoring, during deposition, the layer growth, the high index layer being monitored via reflection high energy electron diffraction, the low index layer being monitored via interferometric technique capable of sub-angstrom resolution;

monitoring intrinsic stress using an in-situ cantilever-based intrinsic stress optical monitor;

adjusting the intrinsic stress via deposition parameter modification;

monitoring indices of refraction during deposition via an in-situ ellipsometer;

measuring surface roughness using a reflection technique selected from the group consisting of: p-polarized reflection spectroscopy, phase modulated ellipsometry, and real-time atomic force microscopy;

depositing approximately a 1-10 nanometer thick first layer of amorphous diamond-like carbon onto at least one layer;

directing an oxygen ion beam onto the at least one carbon coated layer;

rastering the ion beam in a sweeping fashion to allow interaction with only the carbon which protrudes above average surface height, the rastering being continued until a top layer of carbon is reduced to the level of the highest peaks in the layer; and,

repeating the process as necessary, alternating the high and low index layers.

2. (Currently Amended) A process for optical filter construction, the process comprising the steps of:

depositing at least one layer of material having either a high or low index of refraction onto a substrate;

monitoring layer growth;

monitoring intrinsic stress;

adjusting intrinsic stress~~, if necessary~~;

monitoring indices of refraction;

depositing amorphous carbon onto the at least one layer; and

smoothing the carbon coated layer by directing an ion beam onto the carbon coated layer.

3. (Previously Amended) The process of claim 2 comprising the step of:

depositing a layer having a high index of refraction onto a substrate.

4. (Currently Amended) The process of claim 3, wherein the process further comprises the steps of:

depositing a layer having a low index of refraction onto the carbon coated high index layer;

monitoring layer growth;

monitoring intrinsic stress;

adjusting intrinsic stress~~, if necessary~~;

monitoring indices of refraction;

depositing amorphous carbon onto the low index layer; and

smoothing the carbon coated layer by directing an ion beam onto the carbon coated low index layer.

5. (Previously Presented) The process of claim 4, wherein depositing at least one layer onto a substrate comprises the step of:

depositing at least one layer of material selected from the group consisting of: titanium dioxide, amorphous silicon, and tantalum pentoxide, onto a fused silica substrate.

6. (Previously Presented) The process of claim 5, wherein depositing a layer of material having a low index of refraction onto the carbon coated high index layer comprises the step of:

depositing a layer of material selected from the group consisting of: silicon dioxide and magnesium fluoride, onto a fused silica substrate.

7. (Previously Presented) The process of claim 6, wherein monitoring layer growth comprises the step of:

monitoring, during deposition, the layer growth, the layer of material having a high index of refraction being monitored via reflection high energy electron diffraction, the layer of material having a low index of refraction being monitored via interferometric technique capable of sub-angstrom resolution.

8. (Original) The process of claim 7, wherein monitoring intrinsic stress comprises the step of:

monitoring intrinsic stress using an in-situ cantilever-based intrinsic stress optical monitor.

9. (Original) The process of claim 8, wherein adjusting intrinsic stress comprises the step of:

adjusting the intrinsic stress via deposition parameter modification.

10. (Original) The process of claim 9, wherein monitoring indices of refraction comprises the step of:

monitoring indices of refraction during deposition via an in-situ ellipsometer.

11. (Previously Presented) The process of claim 10, wherein after monitoring indices of refraction during deposition via an in-situ ellipsometer, the process comprises the step of:

measuring surface roughness using a reflection technique selected from the group consisting of: p-polarized reflection spectroscopy, phase modulated ellipsometry, and real-time atomic force microscopy.

12. (Previously Presented) The process of claim 11, wherein depositing amorphous carbon onto the at least one layer comprises the step of:

depositing approximately a 1-10 nanometer thick first layer of amorphous carbon onto the layer of material having a high index of refraction.

13. (Previously Presented) The process of claim 12, wherein directing an ion beam onto the carbon coated layer comprises the step of:

directing an oxygen ion beam onto the carbon coated layer.

14. (Previously Presented) The process of claim 13, wherein smoothing the carbon coated layer comprises the steps of:

rastering the ion beam in a sweeping fashion to allow interaction with only the carbon which protrudes above average surface height, the rastering being continued until a top layer of carbon is reduced to the level of the highest peaks in the layer.

15. (Previously Presented) The process of claim 4, wherein depositing amorphous carbon onto the layer of material having a low index of refraction comprises the step of:

depositing approximately a 1-10 nanometer thick second layer of amorphous carbon onto the layer.

16. (Previously Presented) The process of claim 15, wherein directing an ion beam onto the carbon coated layer of material having a low index of refraction comprises the step of:

directing an oxygen ion beam onto the carbon coated layer.

17. (Previously Presented) The process of claim 16, wherein smoothing the carbon coated layer comprises the steps of:

rastering the ion beam in a sweeping fashion to allow interaction with only the carbon which protrudes above average surface height, the rastering being continued until a top layer of carbon is reduced to the level of the highest peaks in the layer; and,

repeating the process as necessary, alternating the high and low index layers.

18. (Withdrawn) An optical filter constructed using the process of claim 2.

19. (Previously Presented) The process of claim 4, wherein the process further comprises the step of:

smoothing the carbon layer until the surface roughness is approximately less than 0.1 nanometers.

20. (Currently Amended) A method of making an optical filter comprising the step of forming a layer of amorphous carbon between a layer of ~~relatively~~ high index of refraction material and a layer of ~~relatively~~ low index of refraction material.

21. (Previously Presented) The method of Claim 20 further comprising the step of reducing the surface roughness of the carbon layer prior to depositing material on the carbon layer.

22. (Previously Presented) The method of Claim 21 wherein the step of reducing the surface roughness of the carbon layer comprises the step of directing an ion beam at the surface.

23. (Previously Presented) The method of Claim 22 wherein the ion beam comprises oxygen.

24. (Previously Presented) The method of Claim 20 wherein the carbon layer comprises diamond like carbon.

25. (Previously Presented) A method of making an optical filter comprising the step of forming a layer of amorphous carbon between layers of materials having different indices of refraction.

26. (Previously Presented) A method of making an optical filter formed by alternating layers of materials having high and low indices of refraction, said method comprising the step of depositing amorphous carbon on at least one layer of material.